

Climate Change Summary, Saint Croix Island International Historic Site, Maine

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Climate Trends for the Area within Park Boundaries

- Temperature and precipitation have increased since 1950 (Figures 1, 2), but the rates were not statistically significant. Trends increase from northwest to southeast (Figures 3, 4).
- If the world does not reduce emissions from cars, power plants, and deforestation by 40 to 70%, models project substantial warming and increased total precipitation (Figure 5).

Vulnerabilities in eastern Maine

- Sea level at Eastport, south of the park, rose at a rate of 20 ± 2 cm/century from 1929 to 2006 (National Oceanic and Atmospheric Administration, <http://tidesandcurrents.noaa.gov>).
- Climate change may cause earlier ice-out (melting) of lakes and rivers (Hodgkins et al. 2002).
- Boreal conifer forest ecosystems are vulnerable to future northward shifts due to climate change (Gonzalez et al. 2010), exacerbated by habitat fragmentation (Eigenbrod et al. 2014).

Table. Historical and projected changes (data Daly et al. 2008, IPCC 2013; analysis Wang et al. in preparation). The table only gives central values. Figures 1-5 show the uncertainties.

	1950-2010	2000-2050	2000-2100
Historical			
temperature	+0.4°C/century (+0.7°F./century)		
precipitation	+15%/century		
Projected (compared to 1971-2000)			
Low emissions (IPCC RCP 4.5)			
temperature		+2.3°C (+4.1°F.)	+3°C (+5.4°F.)
precipitation		+9%	+7%
High emissions (IPCC RCP 6.0)			
temperature		+2°C (+3.6°F.)	+3.5°C (+6.3°F.)
precipitation		+8%	+11%
Highest emissions (IPCC RCP 8.5)			
temperature		+3°C (+5.4°F.)	+5.3°C (+9.5°F.)
precipitation		+10%	+15%

Figure 1. Historical annual average temperature for the area within park boundaries and 1950-2010 trend. (Data: Daly et al. 2008, IPCC 2013. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).

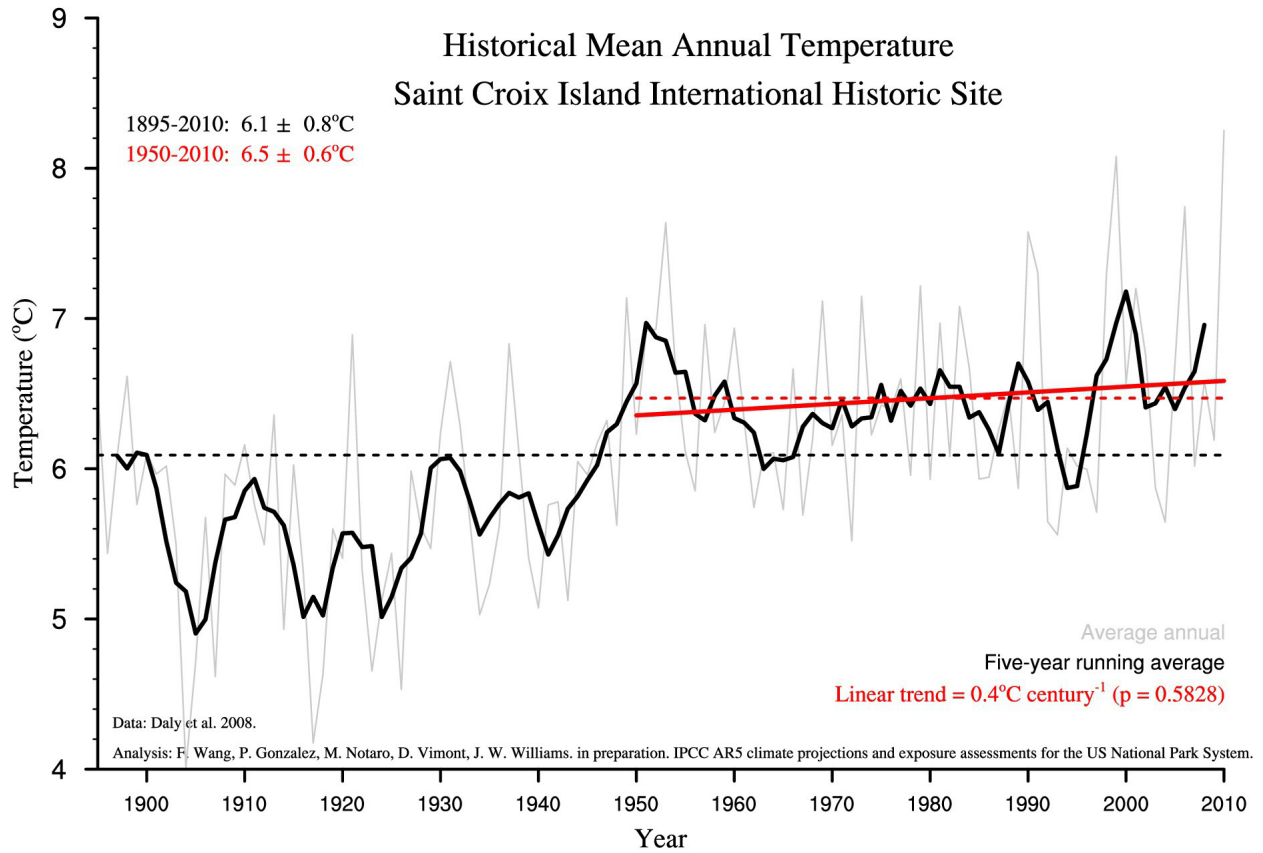


Figure 2. Historical annual total precipitation for the area within park boundaries and 1950-2010 trend. (Data: Daly et al. 2008, IPCC 2013. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).

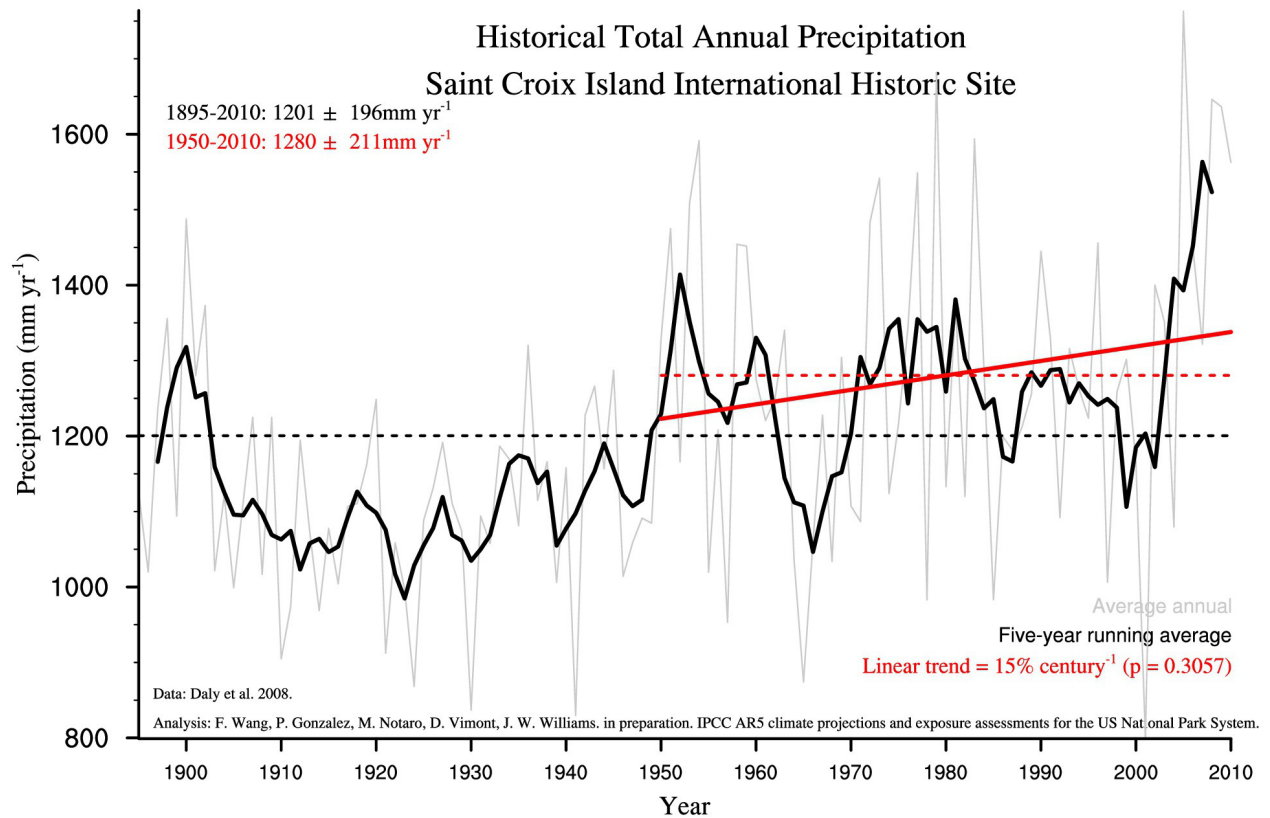
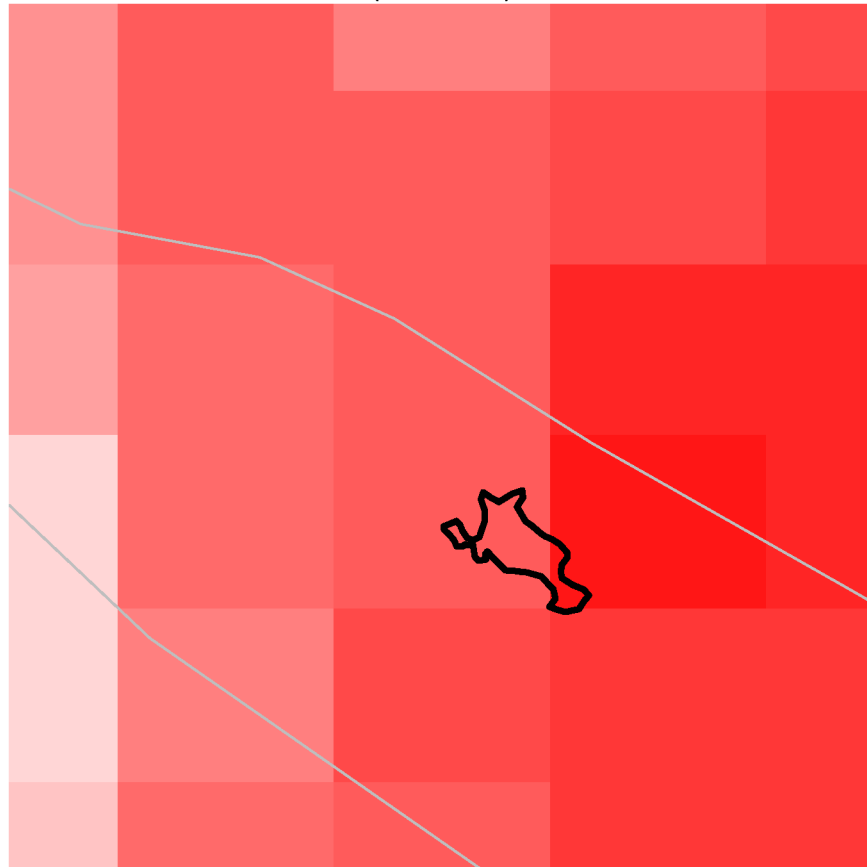


Figure 3. Historical annual average temperature rate of change, 1950-2010. (Data: Daly et al. 2008. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).

Linear Trend in Historical Mean Annual Temperature ($^{\circ}\text{C century}^{-1}$)
Saint Croix Island International Historic Site
(1950 - 2010)



Data: IPCC 2013. Daly et al. 2008. Analysis: F. Wang, P. Gonzalez, M. Notaro, D. Vimont, J. W. Williams.



Figure 4. Historical annual total precipitation rate of change, 1950-2010. (Data: Daly et al. 2008. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).

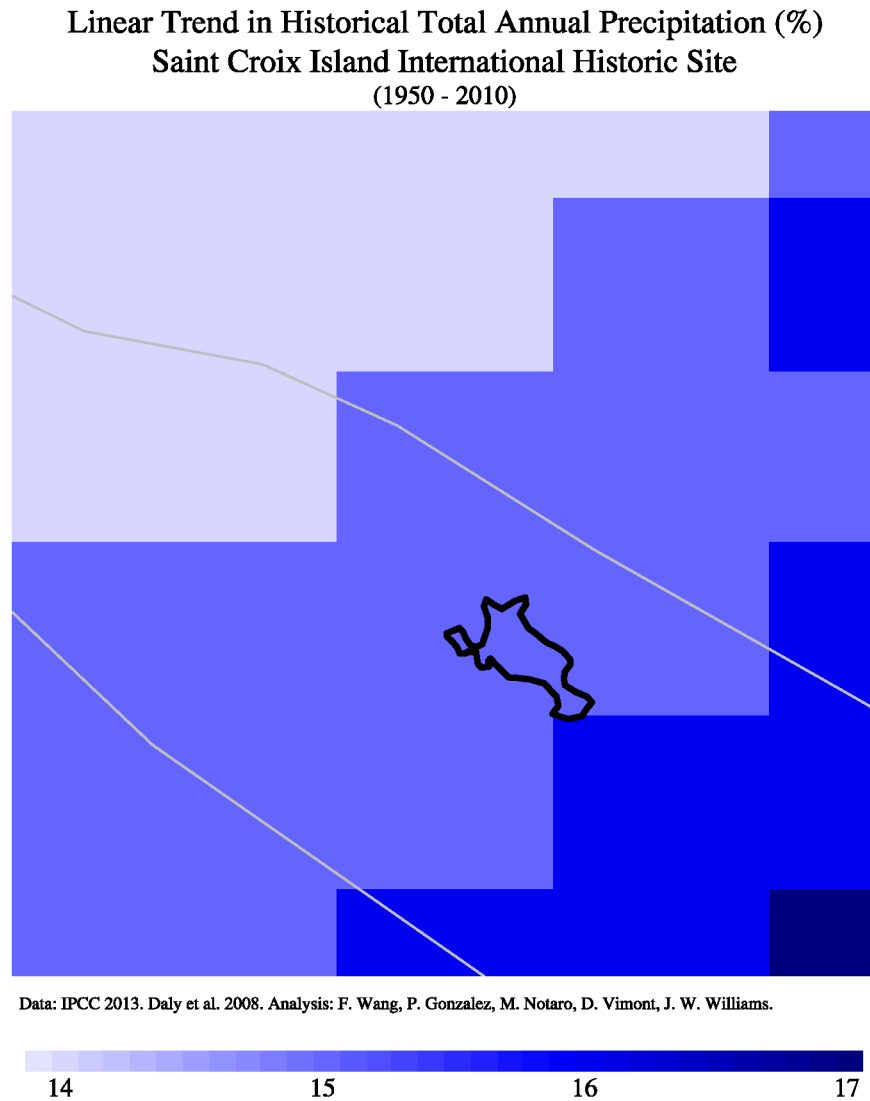
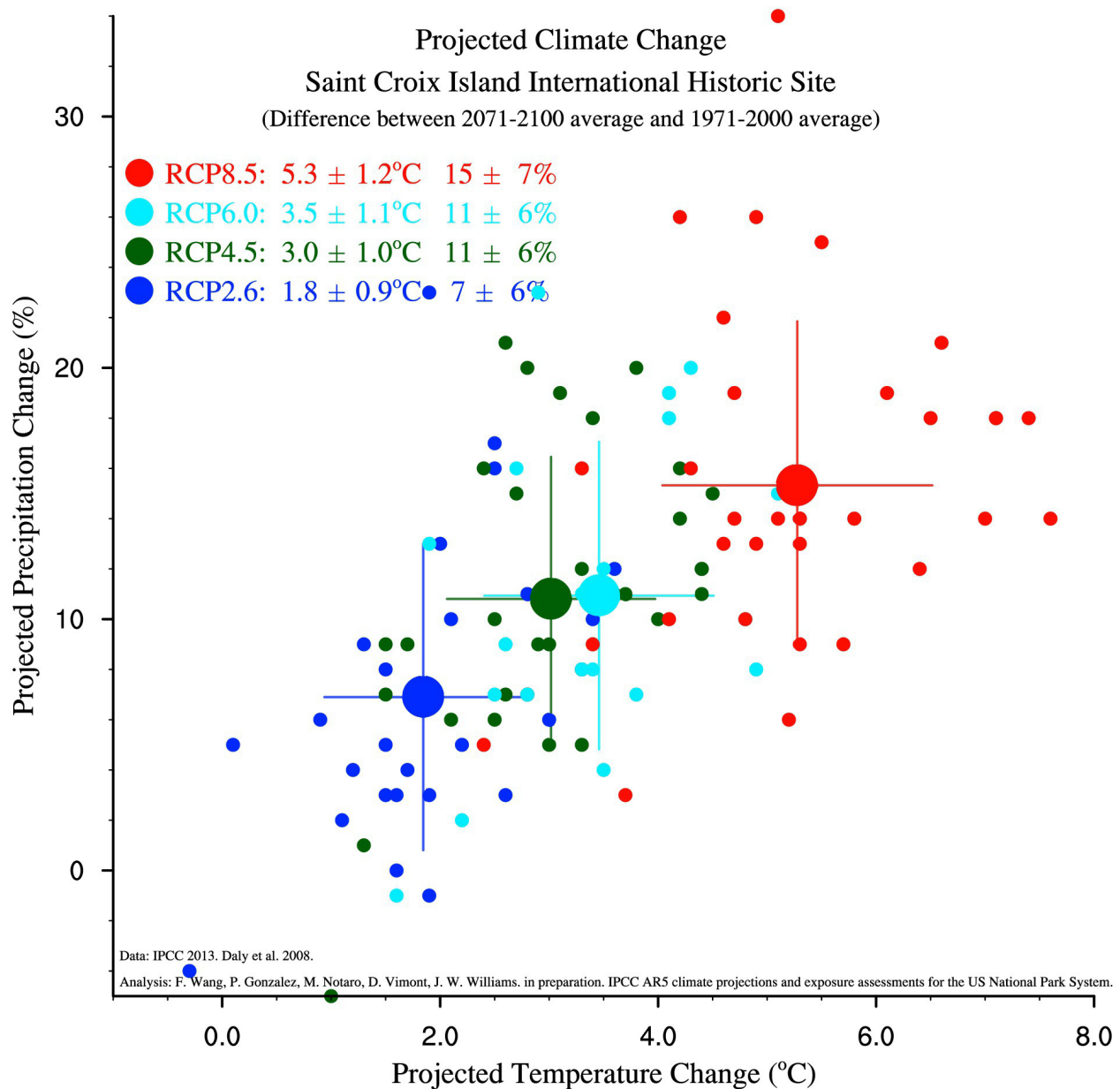


Figure 5. Projections of future climate for the area within park boundaries. Each small dot is the output of a single climate model. The large color dots are the average values for the four IPCC emissions scenarios. The lines are the standard deviations of each average value. (Data: IPCC 2013, Daly et al. 2008; Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).



References

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